

MA 55-1  
EA 12-1: 1969

1969 ANNUAL REPORT



**DIVISION OF  
WATER RESOURCES**

EA 12-1: 1969





The Commonwealth of Massachusetts  
Leverett Saltonstall Building  
Government Center  
100 Cambridge Street, Boston 02202

ANNUAL REPORT  
to the  
MASSACHUSETTS WATER RESOURCES COMMISSION  
by the  
Director and Chief Engineer  
Division of Water Resources  
for the  
Fiscal Year Ending June 30, 1969



## INTRODUCTION

The Water Resources Commission was established by Chapter 620 of the Acts of 1956. This legislation also provided for a Division of Water Resources as the operating agency of the Commission. Chapter 685 of the Acts of 1966 established a Division of Water Pollution Control as a second operating agency of the Water Resources Commission.

A permanent office and staff for the Division of Water Resources was established on January 1, 1959, so this report includes the operations of this Division for the tenth complete Fiscal Year. The overall supervisory responsibility for the Division rests with the following individuals who collectively constitute the Water Resources Commission:

CHAIRMAN - Arthur W. Brownell  
Commissioner of Natural Resources

AGRICULTURE REPRESENTATIVE - Nathan Chandler, Commissioner  
Department of Agriculture

Designee - Myron A. Maiewski, Assistant Commissioner  
Department of Agriculture

COMMERCE & DEVELOPMENT REPRESENTATIVE - Theodore Schulenberg, Commissioner  
Department of Commerce &  
Development

Designee - Regis J. Harrington, Division of Planning  
Department of Commerce and Development

PUBLIC HEALTH REPRESENTATIVE - Dr. Alfred L. Frechette, Commissioner  
Department of Public Health

Designee - John C. Collins, Director  
Division of Sanitary Engineering  
Department of Public Health

PUBLIC WORKS REPRESENTATIVE - Edward J. Ribbs, Commissioner  
Department of Public Works

Designee - Edward Chase, Division of Waterways  
Department of Public Works

CHAPTER I

The first part of the book is devoted to a general survey of the subject. It begins with a definition of the term "philosophy" and proceeds to a discussion of the various branches of the discipline. The author then outlines the main problems of philosophy and the methods used to solve them.

The second part of the book is devoted to a detailed examination of the various branches of philosophy. It begins with a discussion of metaphysics and proceeds to a discussion of epistemology, ethics, and politics. The author then discusses the history of philosophy and the contributions of various philosophers.

The third part of the book is devoted to a discussion of the philosophy of science. It begins with a discussion of the philosophy of physics and proceeds to a discussion of the philosophy of biology, psychology, and sociology. The author then discusses the philosophy of language and the philosophy of art.

The fourth part of the book is devoted to a discussion of the philosophy of religion. It begins with a discussion of the philosophy of theology and proceeds to a discussion of the philosophy of religion. The author then discusses the philosophy of law and the philosophy of education.

The fifth part of the book is devoted to a discussion of the philosophy of life. It begins with a discussion of the philosophy of biology and proceeds to a discussion of the philosophy of psychology, sociology, and politics. The author then discusses the philosophy of art and the philosophy of literature.

The sixth part of the book is devoted to a discussion of the philosophy of death. It begins with a discussion of the philosophy of theology and proceeds to a discussion of the philosophy of religion. The author then discusses the philosophy of law and the philosophy of education.

The seventh part of the book is devoted to a discussion of the philosophy of the future. It begins with a discussion of the philosophy of science and proceeds to a discussion of the philosophy of technology, politics, and society. The author then discusses the philosophy of art and the philosophy of literature.

METROPOLITAN DISTRICT COMMISSION - Howard Whitmore, Commissioner  
Metropolitan District Commission

Designee - Allan Grieve, Director and Chief Water Supply  
Engineer, Metropolitan District Commission  
Water Division

PUBLIC MEMBERS

Peter C. Karalekas  
322 Prospect Street  
East Longmeadow, Massachusetts 01028

Robert E. O'Brien, President  
Bio-Dynamics, Inc.  
33 Cambridge Parkway  
Cambridge, Massachusetts

Donald M. DeHart, Executive Director  
New England Aquarium  
Central Wharf  
Boston, Massachusetts

Mr. Arthur W. Brownell was appointed Commissioner of the Department of Natural Resources succeeding Robert L. Yasi, who joined Acting Governor Sargent's Staff. Mr. Brownell presided over the meetings of the Water Resources Commission beginning in January. The Commission's appreciation of Mr. Yasi's contributions was expressed as the result of a motion on January 13, 1969, as follows:

"WHEREAS, you have resigned as Commissioner of the Department of Natural Resources and, as such, the Chairman of the Water Resources Commission in order to take up other important duties in the service of the Commonwealth, it is appropriate, fitting and desirable at this time that the members and their designees of the Commission express their great indebtedness to you for your devotion and invaluable contributions as Chairman and for your leadership in the planning, development and management of water resources."





# DIVISION OF WATER RESOURCES

## Staff

The staff of the Division of Water Resources consisted of the following persons as of June 30, 1969:

Director and Chief Engineer	- Charles F. Kennedy
Associate Civil Engineer	- Oden F. Pyle
Principal Civil Engineer	- Thomas F. Doucette
Resources Planner	- Emerson H. Chandler
Resources Planner	- Clinton E. Watson
Senior Civil Engineer	- Michael L. Beshara
Senior Civil Engineer	- Jason Kirshen
Senior Civil Engineer	- James F. Matera
Assistant Civil Engineer	- Richard T. Spofford
Junior Civil Engineer	- Kevin B. Maguire
Senior Engineering Draftsman	- William M. Everberg
Principal Clerk	- Isabel F. Moors
Senior Statistical Clerk	- Philip Tanzer
Senior Bookkeeper	- Dorothy Hurley
Senior Clerk & Stenographer	- Susan M. Griffin
Senior Clerk & Stenographer	- Mary F. Herlihy
Junior Clerk & Typist	- Louise S. Alberts

The authorized table of organization of the Division of Water Resources includes 17 permanent positions and 3 temporary positions.

The requests for new positions were not granted during the 1969 legislative session, nor were any temporary positions made permanent.

## Administrative Appropriations

<u>Fiscal Year</u>	<u>Appropriation</u>
1959	\$ 70,800.
1960	\$ 75,915.
1961	\$ 79,475.
1962	\$ 88,920.
1963	\$117,402.
1964	\$129,649.
1965	\$139,181.
1966	\$140,573.
1967	\$127,946.
1968	\$153,411.
1969	\$190,412.



In addition, the following sums were appropriated for the operation of the three Interstate Flood Control Commissions:

Thames River Valley Flood Control Commission	--	\$ 600.00
Connecticut River Valley Flood Control Commission	--	\$ 49,106.00
Merrimack River Valley Flood Control Commission	--	\$ 80,450.00

These funds were used for the payment of the Commonwealth's share of operating the respective Flood Control Commissions, and the annual tax and economic losses to the up-river states caused by the construction of flood control reservoirs.

Other major appropriations:

Water Planning	--	\$ 66,232.00
P.L. 566 Maintenance	---	\$ 21,150.00
Federal Cooperative Studies	---	\$140,000.00
New England River Basins Commission	--	\$ 10,000.00
Ipswich River Watershed Districts	--	\$ 3,550.00

Total Budget Appropriations

<u>Fiscal Year</u>	<u>Appropriation</u>
1969	\$563,500.00

Activities

- I Coordination of Water Resources Activities of State, Interstate and Federal Agencies as They Affect Massachusetts.

Interstate Agencies

The Chairman of the Commission serves as one of the Massachusetts representatives on the New England Interstate Water Pollution Control Commission.





The Director of the Division of Water Resources serves as a Commissioner on two Interstate Flood Control Commissions, namely the Connecticut River Valley Flood Control Commission and the Thames River Valley Flood Control Commission. The Division aided in the production of the Biennial Report of the latter Commission for Fiscal Years 1967-1968.

#### New England River Basins Commission

The Chairman of the Water Resources Commission is a member of the New England River Basins Commission established in 1967 under the authority of Title II of Public Law 89-80. The Commission has representation from the six New England States and seven Federal agencies. The Commission is planning to sponsor a comprehensive water and related land resources study of southeastern New England. The Director and staff of the Division of Water Resources have participated in New England River Basins Commission meetings and as members of sub-committees, including study groups dealing with small dams, water supply and the Southeastern New England Study.

#### Federal Agencies

##### Corps of Engineers, Department of the Army.

The Commission is designated as the responsible agency to represent the Commonwealth of Massachusetts on planning and construction of flood control projects. In addition, the Division of Water Resources reviews all of the projects of the Corps of Engineers, advising on the action that the Commonwealth should take. In this regard, numerous conferences were held with the Corps of Engineers, concerning several proposed projects including a major study proposal for the Narraganset Bay drainage including the Blackstone and Taunton Rivers. Studies in progress by the Corps of Engineers are discussed under Planning in this report.

##### Soil Conservation Service, U. S. Department of Agriculture.

Under the enabling act creating the Water Resources Commission, the Commission, acting through the Division of Water Resources, is the agency responsible for state participation with the Soil Conservation Service in the small watershed program under Public Law 566. This participation is a primary input to the federal program and includes identification of needs, selection of sites, meetings with local officials, public information meetings, and other administrative duties in the capacity of contracting officer. This program constitutes a major portion of the total work of the Division. After study by the Division and deliberation by the Commission the following motions were voted at regular Commission monthly meetings:





1. Authorized the Director and Chief Engineer to sign Project Agreements with the Soil Conservation service as follows:

Quaboag Watershed

East Brookfield Floodwall Repairs (SCS to Contract)

SuAsCo Watershed

A-1 Site

Delaney Site (including operation, maintenance and land rights)

Pine Tree Brook

Agreement with the Town of Milton

2. Authorized the Director and Chief Engineer to sign a contract for reservoir site studies. This study was enlarged to a Type IV statewide water resources study, involving not only the Soil Conservation Service, but the Economic Research Service and Forest Service as well.

3. Authorized the Director and Chief Engineer to sign an amended application for the Weweantic River Watershed.

4. Authorized the Director and Chief Engineer to sign supplement number two to the Quaboag Watershed Work Plan.

5. Approved the transfer of the West Lake and Abbey Sites (Clam River Watershed) to the Division of Forests and Parks.

6. Authorized a study of the feasibility of providing low-flow augmentation from one or more sites on the Quaboag Watershed Project.

Department of Commerce. Cooperation is maintained with the Weather Bureau in the Department of Commerce through the exchange of rainfall data, and by the Bureau's provision of river cresting predictions from the River Forecast Center at Hartford, Connecticut.

Department of the Interior. The Director was authorized to enter into agreements with the Geological Survey to continue groundwater favorability studies and the cooperative stream gauging program.

#### State Agencies

The Division submitted planning proposals for review to the Divisions of Water Pollution Control, Forests and Parks, Marine Fisheries, Fisheries and Game, the Department of Public Works, the Metropolitan District Commission and the Public Access Board.



Over 290 Hatch Act applications received by the Division of Conservation Services were submitted for review by Division personnel to determine the effects of proposed wetland alterations on water resources, and to prevent additional flood damage potential. Staff personnel attended the hearings held under the Coastal Wetlands Act to present testimony. The provision of additional staff positions in the 1969 budget has improved our ability to participate in the various phases of the wetlands protection program.

The Director and Chief Engineer functioned as Chairman of the Inland Wetlands Committee in cooperation with committee members from other Divisions in the Department of Natural Resources. A preliminary meeting of representatives of the many State Departments and agencies involved in resource management was called to provide leadership and participation in the new statewide Type IV Water Resources Study. A continuing program of interagency coordination will be an essential part of this study to insure that the Commonwealth will receive the greatest benefit.

An annual cooperative program was instituted to provide snow melt data from nine new snow courses in eastern Massachusetts. Field personnel of the Division of Forests and Parks and Fisheries and Game are participating in the collection of data. The program is designed to survey the eastern watersheds not presently covered by the U. S. Army Corps of Engineers.

#### Planning Regions

In recognition of the role of the twelve regional district planning commissions in planning for the future water resource needs, personnel to provide liaison between each district and the Division have been assigned. As drafts of regional water supply reports are developed, they are reviewed by the staff of the Division. During the Fiscal Year, a Regional Study for Water Supply, Sewage Disposal and Drainage, Southeastern Massachusetts, Phase II was submitted and reviewed.

The Division views the projections of regional water needs to be necessary elements in the development of the state water resources plan. Toward this end, a closer coordination of Division activities and those of regional planning districts will be developed.

#### Municipalities

The Division provides limited consultant services, where possible, to towns regarding local water resources problems. Town Natural Resources Inventory Reports prepared by the Natural Resources Technical Teams for the Town of Billerica and West Newbury were reviewed with special attention given to their content concerning water resources matters.





## II Legislation Directly Affecting the Division of Water Resources

The following acts and resolves directly affecting the Division of Water Resources were passed during the Fiscal Year covered by this report:

### Acts of 1968

Chapter 606 - An Act authorizing the Lynnfield Water District to use and sell the waters of the Ipswich River.

Chapter 634 - An Act authorizing the Water Resources Commission to construct reservoirs and other works of improvement for flood prevention, low flow regulation, recreation and related purposes in the Watershed of the West Branch of the Westfield River.

Chapter 651 - An Act authorizing the Water Resources Commission to construct reservoirs and other works of improvement for flood control, recreation, and related purposes in the Watershed of the Washington Mountain Brook in the towns of Lee and Washington.

Chapter 678 - An Act increasing the amount of money which the Commonwealth may borrow to meet the non-Federal cost of certain works of improvement for flood prevention and water resource utilization in the Watershed of the Quaboag River and providing for the receipt of Federal assistance.

Chapter 680 - An Act increasing the amount of money which the Commonwealth may borrow to meet the non-Federal cost of certain works of improvement for flood prevention and water resource utilization in the Watershed of the Clam River, increasing the scope of the work in said Watershed, and providing for the receipt of Federal financial assistance.





### III Collection of Basic Data

#### Rainfall

The Commission continues to operate a system of 115 rainfall stations. The rainfall data collected from these stations is exchanged with the U.S. Weather Bureau for data on the stations which they operate. Thus, the Commonwealth has an active network of 142 rain gages in operation at the present time. We also have three automatic rain gages in operation, one in Springfield, one in Maynard, and one in Lawrence.

The annual rainfall for the various sections of the State for the Calendar Year 1968, as shown by representative long-term stations, is as follows:

#### Rainfall in inches - 1968

	State	Northeast Section	Southeast Section	Central Section	Conn. River Section	Western Section
January	2.92	3.60	3.12	2.82	2.22	1.73
February	1.26	1.20	1.69	0.91	1.21	1.44
March	6.65	7.06	9.32	7.04	4.70	3.73
April	2.26	2.11	1.85	2.23	2.96	3.21
May	3.91	4.13	3.87	5.11	4.51	5.23
June	7.03	8.17	6.08	8.48	8.19	8.07
July	1.72	1.20	1.49	2.51	1.45	1.53
August	1.48	2.12	1.97	1.27	2.04	2.16
September	2.01	1.64	1.20	1.81	3.22	3.52
October	2.19	1.72	2.21	2.11	2.99	3.05
November	6.21	6.72	7.16	6.11	6.36	4.93
December	6.32	5.49	6.71	6.31	5.70	5.48
Year	43.96	45.16	46.67	46.71	45.55	44.08
Normal	43.64	42.23	43.93	43.83	43.79	43.39



Rainfall Excess or Deficiency (In inches) - 1968

	<u>State</u>	<u>Northeast Section</u>	<u>Southeast Section</u>	<u>Central Section</u>	<u>Conn. River Section</u>	<u>Western Section</u>
January	-0.68	-0.06	-0.81	-0.95	-1.11	-1.47
February	-2.06	-2.20	-1.81	-2.57	-1.87	-1.47
March	+2.82	+3.29	+5.25	+3.08	+1.09	+0.32
April	-1.36	-1.49	-2.13	-1.54	-0.56	-0.38
May	+0.35	+0.84	+0.51	+1.69	+0.71	+1.67
June	+3.57	+4.91	+3.02	+4.88	+4.39	+4.13
July	-1.98	-2.27	-1.48	-0.95	-2.68	-2.82
August	-2.54	-1.54	-2.15	-2.38	-1.87	-1.90
September	-1.56	-1.91	-2.43	-1.93	-0.64	-0.53
October	-1.25	-1.55	-1.24	-1.15	-0.47	-0.19
November	+2.31	+2.95	+3.09	+2.13	+2.51	+1.16
December	+2.70	+1.97	+2.92	+2.57	+2.26	+2.71
Excess	+11.75	+13.96	+14.79	+12.66	+10.96	+9.99
Deficiency	-11.43	-11.02	-12.05	-11.47	- 9.20	-9.76
Total	+ 0.32	+2.94	+ 2.74	+ 1.99	+ 1.76	+0.23





### Flood Information

During March and April an abnormally high snow melt potential heightened the danger of spring flooding. A gradual run-off, however, allowed most of the state to escape serious flooding. Flood data was recorded from March 18 to April 23, and during this critical period, information was provided to the Massachusetts Civil Defense Agency.

Data gathered by many agencies during the flood of March, 1968 was assembled and recorded in book form. The 1936 flood data report was also reproduced and rebound.

### Snow Measurements

During March, nine new snow courses were established by the Division. The purpose of these courses is to provide weekly readings of snow depth, water content and density for the streams discharging into the Atlantic, east of Worcester and ringing the Boston area. This data provides a measure of the potential annual flooding caused by snow melt and supplements the long established snow data collection programs of the Army Corps of Engineers and the Metropolitan District Commission.

The recording and exchange of data concerning flood potentials and actual river stages will be expanded during the coming fiscal year.



### Stream Flow

There are 92 stream gaging stations in the Commonwealth operated by U.S. Geological Survey in cooperation with state and federal agencies as follows: 23 with the Water Resources Commission, Division of Water Resources, 14 with the Metropolitan District Commission, 35 with the Department of Public Works, 14 with the Corps of Engineers, 3 by U.S. Geological Survey alone, and 3 privately owned which furnish records to the U.S. Geological Survey. The results are published annually in the U.S. Geological Survey Water Supply Report, "Water Resources Data for Massachusetts, New Hampshire, Rhode Island and Vermont."

The Commission continued to cooperate with the U.S. Geological Survey in obtaining base flow measurements for small drainage areas on a number of tributaries throughout the Commonwealth. These base flow measurements constitute a vital element in water resources planning.

### Ground Water Data

Under the cooperative agreement with the ground water branch of the U.S. Geological Survey, studies were continued in the Neponset-Weymouth River Basins, the Deerfield - Hoosic River Basins, the Charles River Basin, and the Lower Merrimack River Valley.

Investigations completed and printed were in the Housatonic River Basin, the northern part of the Taunton-Ten Mile River Basins, the Assabet River Basin, and in cooperation with the M.D.C., the Millers River Basin.





### Registration of Well Drillers

Chapter 513 of the Acts of 1962 requires that any person, corporation, company, or partnership engaged in the business of digging or drilling wells in the Commonwealth, shall obtain a Certificate of Registration from the Water Resources Commission before July 1st of each year. During the fiscal year 1969, 125 well drillers throughout the Commonwealth were registered with the Commission. Chapter 513 further requires that all registered well drillers shall submit a report to the Commission setting forth pertinent information on all wells drilled. This information is kept on file in the office of the Commission and is made available for public use in determining the ground water resources of the Commonwealth.



#### IV Management of Water Usage

##### Yield of Muschopauge Pond

Under the provisions of Chapter 414 of the Acts of 1958, the town of Holden reported monthly the quantity of water withdrawn from Muschopauge Pond and the towns of Rutland and Holden reported monthly the water level in the Pond. In the event that the water level of the Pond drops below 5' from the top of the spillway, the Water Resources Commission judges the amount of water to be withdrawn by each town upon application of either town.

Regulatory action under this Act was not necessary during the period covered by this report. Withdrawals by the town of Holden were voluntarily cut back as the water level approached five feet below spillway elevation.

##### Walden Pond

The County Commissioners of Middlesex County continued to cooperate with the Commission in submitting to this office periodic records as to the elevation of Walden Pond in Concord.

##### Flood Control - Sudbury River

The Commission continued to coordinate the operation of the reservoirs of the Water Division of the Metropolitan District Commission and the Department of Natural Resources located on the Sudbury River. The reservoirs are operated so that during the recreational season 1,500 million gallons and during the remainder of the year 2,600 million gallons of storage capacity are kept available for the storage of flood flows in order to reduce flood hazards along the river.

Modification of the outlet structure at Hopkinton Reservoir is planned by the Division of Forests and Parks to facilitate drawdowns in compliance with the flood storage program.





## Current Status of Planning

The planning of water and related land resources is being conducted at several levels of government, with many objectives and often with different time frames. The Water Resources Commission, as a coordinating and participating agency, is seeking to make these varied efforts meaningful inputs to a state water resources plan.

### State - Federal Studies

#### North Atlantic Regional Water Resources Study

This framework study (Type I) covers the Atlantic Seaboard drainages from the James River Basin in Virginia north to the Canadian border. It aims to identify projected water and related land resources needs and generalized potentials to satisfy those needs. The basic information assembled is designed to be used as a guideline for subsequent Type II comprehensive studies which will seek to meet detailed needs with specific project elements.

The Commissioner, the Director and Division Planners have served as state members on the coordinating committee of this study, attending planning sessions involving those basins lying in Massachusetts. The study, due for completion in 1970, will contain a section provided by the Division describing the legal and institutional framework relating to water resources in the Commonwealth. Substantial progress on the compilation of this study appendix was made during the Fiscal Year.

#### Connecticut River Basin Comprehensive Study

This Type II study is the kind of in depth study which in the future will be based upon the results of the NAR Type I Study. The Connecticut River investigation, led by the U.S. Army Corps of Engineers, has been in progress, however, for six years and will be completed in 1970. The Coordinating Committee representation at the state level is the same as in the NAR Study. In addition, the Director and Chief Engineer is a member of the Institutional Arrangements Subcommittee, and a Division resources planner is a member of the Public Information Subcommittee.

Staff participation, in addition to committee work, has consisted of a review of project proposals including coordination with the Division of Water Pollution Control, Division of Forests and Parks, Division of Fisheries and Game, the Metropolitan District Commission and others who have responsibilities in a particular phase of the study. Proposals for nine new Corps of Engineers dams were reviewed, as were proposals for multi-purpose use of the structures and of four existing Corps Projects (Tully, Knightville, Barre Falls and Conant Brook). Corps proposals relative to navigational improvements in the lower Connecticut, and the relicensing of power dams requiring passage of certain continuous flows were reviewed. Review and written comments were also submitted to the Bureau of Outdoor Recreation relative to the designation of certain reaches of streams as scenic or recreation rivers.





The U.S. Department of Agriculture, Soil Conservation Services submitted fifty-three potential storage sites for review. As with the proposals for Corps dams, these plan elements were evaluated by the planning staff and state views were submitted in writing to the Coordinating Committee.

In addition to this review and comment function, the Division is preparing Appendix J of the basin study report - a review of state laws, policies, and programs, and a brief summary of each sub-watershed's needs and potentials. Attendance of staff personnel was required at numerous sub-committee meetings, five executive sessions, two public sessions of the coordinating committee, and one public informational meeting.

As the study is scheduled to be completed in 1970, the public information program looms increasingly important. The informational meeting scheduled for September will be followed by formal hearings in the fall and winter. The study will have major recommendations which will affect future water supply, recreation, pollution abatement, and anadromous fish restoration. The Commission is playing a major role in seeking to obtain the public support needed to implement the final plan.

The institutional framework needed to administer the proposed facilities which lie in the four basin states is being studied by the Institutional Arrangements Sub-committee. A prominent role may be played by the New England River Basins Commission.

#### Southeastern New England Comprehensive Study

This comprehensive study will formulate a plan to protect and develop the water and related land resources of Southeastern New England. It will be coordinated by the New England River Basins Commission. The area covered by the study includes all of the coastal river basins of Massachusetts from and including the Parker River Basin through the Blackstone River Basin. The Type II Study is designed to develop positive alternatives for the management of the rivers, bays, estuaries, inland waters, ground waters and associated land resources. The four year study is scheduled for initiation in FY 1971, depending on federal fund availability.

Staff of the Planning Section of the Division were active participants in the coordinating committee established to draft a study program. In addition, meetings were held with representatives of the Rhode Island Board of Water Resources and the New England River Basins Commission to establish the optimum procedure for coordination of state agency input to the study. A statement of participation was submitted by the Division, together with a summary of existing planning and research programs and completed studies to be included as an appendix within the study plan. Meetings will be scheduled with the Water Resources Commission, and other state agencies and departments to acquaint them with the overall objectives of the study, and to invite their active participation and support.



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### Northeast Water Supply Study (NEWS)

The Director of the Division of Water Resources participated in this study during the past year. He was especially active in the Ad Hoc Committee concerning the water supply feasibility study for Southeastern New England, including all of the Commonwealth east of the Connecticut River.

### Massachusetts Water Resources Study

The Water Resources Commission and the U.S. Department of Agriculture have signed an agreement to make a five year Type IV Study of land and water resources in Massachusetts. The study will provide data needed to formulate a coordinated plan to meet the water and land related needs through 1980 and to indicate potentials to meet the needs through 2020. The object of the study is to investigate and analyze various aspects of upstream watersheds, including potential reservoirs, appraisal of damages by floodwater, identification of flood plains and wetlands, recreation, water quality and water supply.

During the year, the planning and engineering staff of the Division met with representatives of the Soil Conservation Service, the Economic Research Service, and the Forest Service of the Department of Agriculture to prepare a Plan of Work for the study. After many meetings, and the revision of several preliminary drafts, agreement was reached on a final work plan which is designed to provide us with a study tailored to the needs of the Commonwealth.

A program of interagency cooperation was set up to assure that other state agencies would obtain the maximum benefit from the study. Preliminary data gathering was begun on five of the twenty-eight watersheds outlined in the study.



## Status of Commission's Construction Program

### P. L. 566 - Small Watershed Projects in Cooperation with the Soil Conservation Service

#### SuAsCo - George Nichols Site (A-1) in Westborough

The Director and Chief Engineer was authorized to accept the bid of Northeastern Construction Co., Inc., for the construction of this combination flood control and flow augmentation reservoir. By the close of the Fiscal Year work was approximately fourteen per cent complete.

#### SuAsCo - Delaney Complex in Bolton, Stow, Harvard and Boxborough

The land rights were obtained and the contract advertised for bids during the Fiscal Year. The contract for this multi-purpose flood-water retarding - fish and wildlife project should be awarded early in the 1970 Fiscal Year. Disposal of dwellings taken at this site was authorized by vote of the Commission.

#### SuAsCo - Tyler Site in Northborough and Marlborough

Land surveys continued for this dam on the mainstem of the Assabet River. Meetings with town and industry representatives were held to discuss the relocation of roads and the impact of a planned industrial park on this and other SuAsCo Sites.

#### SuAsCo - Lester G. Ross Site (North Brook) in Berlin

Survey work continued on this project and an informational meeting was held with town officials to discuss project plans.

#### Clam River - South Silver Site in Sandisfield

The work by the Servidone Construction Company of Castleton, New York, on this single purpose floodwater retarding structure was ninety-seven per cent complete by the close of the year. Final seeding will complete the contract early in Fiscal 1970.

#### Clam River - North Silver Site in Sandisfield

The Petricca Construction Company, Inc., of Pittsfield has completed thirty-two percent of the work on this multi-purpose flood-water retarding and recreation project.

#### Clam River - Clam Lake Site in Sandisfield

The status of several planned sites is being reviewed and a major revision of the Clam River Watershed work plan will be considered. Further work on the Clam Lake Site will be delayed until a decision is made on its final role in the watershed work plan.





### Quaboag River - East Brookfield Floodwall

Repairs to this local protection device were ninety percent completed during the Fiscal Year under a contract administered by the Soil Conservation Service.

### Quaboag River - Shaw Site in Leicester and Spencer

The Commission continued its liaison work with the Town of Leicester to solidify plans for the inclusion of a town water supply facility at this floodwater retarding dam. No action was taken leading to the acquisition of land rights pending the finalization of the water supply provisions.

### Quaboag River - Rice Site in Brookfield

While this project was planned to be built as a single-purpose flood control reservoir, the Town of Brookfield has exhibited some interest in the site as a potential water supply. Construction plans are presently indefinite, although acquisition of the site for flood control purposes is complete.

### Quaboag River - Meadow Site in North Brookfield and New Braintree

No action was taken on this project during the Fiscal Year.

### Quaboag River - Channel Improvements - West Brookfield and Warren

Alternatives to the channel improvements contained in the work plan are under study. Future work plan supplements may contain structural measures on the Seven Mile River, the Five Mile River and Turkey Hill Brook which will eliminate the need for channel alterations.

### Watershed Project Maintenance Contracts

Annual maintenance contracts on both the SuAsCo and Quaboag Watersheds were awarded to Arrello, Inc. of Holden in response to low bids of \$5,191.00 and \$3,752.00 respectively.

A contract to provide protective fencing at the Horse Pond Site of the Quaboag Watershed Project was awarded to Agway, Inc., of Holden in response to a low bid of \$9,960.00. This was completed during the Fiscal Year.





Public Law 566 small watershed project requests by the Town of Milton, Walpole and Framingham were coordinated by this Division. A financial agreement between the Town of Milton and the Commission was executed which provides the Commission with local funds needed for the construction of the Pine Tree Brook Small Watershed Project.

SUASCO	UNDER STUDY	PROJECT APPROVED	CONSTRUCTION IN PROGRESS	PROJECT COMPLETED
Nashoba				
Tyler				
Lester Ross				
Delaney Complex				
George Nichols				
A6f				
A3c				
A4c				
A6h				
A4a				
QUABOAG				
Five Mile				
Seven Mile				
Turkey Hill				
Meadow				
Rice				
Shaw				
Sucker				
Lamberton				
Kittredge				
Horse Pond				
CLAM				
Hemlock				
Lower Spectacle				
Clam Lake				
North Silver				
South Silver				
West Lake				
Abbey				

STATUS OF MAJOR SMALL WATERSHED PROJECTS  
PL 566 - JUNE 30, 1969





Completed Projects

## Powdermill Brook

Arm Brook - with the town of Westfield

Powdermill Brook - with the town of Westfield

## Blackberry River

Site #1 in New Marlboro

Site #15 in New Marlboro and Canaan, Connecticut

Projects in the Planning Stage

Washington Mountain Brook - 3 sites, project approved

West Branch of the Westfield River - 11 sites, work plan completed

Baiting Brook, Framingham - under study

Broad Brook - 3 sites, with the town of Easthampton, project approved

Bradley Brook, Russell and Blandford - under study

Little River - under study

Crane Brook and Weweantic River - under study

Ipswich River - preliminary studies completed

Smelt Brook and Monatiquot River - under study

Pine Tree Brook - with the town of Milton, work plan nearly  
completed

Diamond and Trap Hole Brook - preliminary investigation completed

Cold River - under preliminary investigation

Green River - under preliminary investigation



#### IV Research

##### Water Resources Research Center, University of Massachusetts

The Division of Water Resources requested \$17,098.00 in its fiscal year 1969 budget to support the research program of the Water Resources Research Center of the University of Massachusetts. No funds were made available for this purpose.





### Publications

Massachusetts Geodetic Survey Map Atlas, Volume 2, Preliminary Edition,  
1969.

Division of Water Resources, Massachusetts Water Resources Commission.  
Report on Water Resources Management. November 1968.

Report of the Special Commission Directed to Study the Use of Certain  
Lands and Waters in the Commonwealth for Recreational Purposes. Reprint,  
1969. (H-1300, 1933.)

A Summary of Massachusetts State Laws, Policies and Programs Pertaining  
to Water and Related Land Resources, 1969.

Water Resources of the Assabet River Basin, Central Massachusetts. 1969.  
Prepared in cooperation with the U. S. Geological Survey.

Hydrology and Water Resources of the Housatonic River Basin, Massachusetts.  
1968. Prepared in cooperation with the U. S. Geological Survey.

Availability of Ground Water in the Northern Part of Ten Mile and Taunton  
River Basins, Southeastern Massachusetts. 1968. Prepared in cooperation  
with the U. S. Geological Survey.

Plan of Work, Massachusetts Water Resources Study, 1969.  
Prepared in cooperation with the U. S. Department of Agriculture, Soil  
Conservation Service, Economic Research Service and Forest Service.

A Study of Potential Reservoir Sites, Housatonic Study Area, 1969.  
Prepared in cooperation with the U. S. Department of Agriculture, Soil  
Conservation Service



## The Disposition of Last Year's Recommendations

Recommendation #1 - That legislation be submitted by the Water Resources Commission to authorize the Water Resources Commission to approve the appropriation of water.

Results: Legislation to authorize the Water Resources Commission to review all proposals for the acquisition, appropriation or use of waters within the Commonwealth for water supply purposes, was withdrawn during the legislative session.

Recommendation #2 - That legislation be submitted by the Water Resources Commission to authorize the Water Resources Commission to establish priorities for the control of aquatic nuisances in water of the Commonwealth.

Results: Legislation relative to the control of aquatic nuisances in waters of the Commonwealth has passed both the House of Representatives and the Senate, but at this time, has not as yet been enacted by the Governor.

Recommendation #3 - That the Division's basic plan for the development of a comprehensive water resources planning program for the Commonwealth be implemented with the highest degree of priority by the expansion of the Division's staff organization and appropriations in conjunction with increased support from Title III, Water Resources Planning Act.

Recommendation #4 - That the Division's staff and appropriations be expanded by the recommendations contained in the Division's Fiscal Year 1970 budget.

Results: In the Division's 1970 Fiscal Year budget no new positions were authorized on the staff of the Division, and it would appear that substantial progress towards developing the statewide comprehensive water resources planning program will be deferred to a later date.





Recommendation #5 - That the Division examine the desirability and feasibility of regulation of well drillers as to qualifications and minimum standards on work performed.

Recommendation #6 - That the Division explore the advisability of a license law to cover boring contractors for collection of basic groundwater and geological data.

Results: The Division has initiated preliminary work towards implementing these two recommendations by acquiring and reviewing the well driller regulations of other states and a model law from the New England Well Drillers Association. Further progress on these recommendations will be made during the current Fiscal Year.



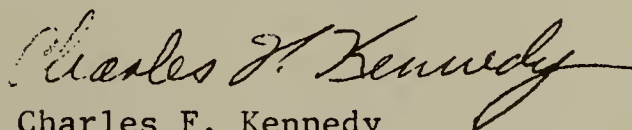
### ACKNOWLEDGEMENTS

The Director would like to express his thanks to the members of the Commission representing the various State Departments and the general public for continued guidance and assistance and for making the resources of their Departments available to this office in carrying out its responsibilities.

To the Chairman of the Water Resources Commission who has provided invaluable direction, assistance and cooperation.

I would also like to thank the staff of this Division for their assistance during the fiscal year and in the preparation of this report; and express my gratitude as well to the many Federal and State agencies; voluntary and professional groups, for their continued assistance.

Respectfully submitted,

A handwritten signature in cursive script, reading "Charles F. Kennedy". The signature is written in dark ink and is positioned above the printed name and title.

Charles F. Kennedy  
Director and Chief Engineer







